

## **CHAPTER 2**

# **DEVELOPMENT OF ALTERNATIVES**

This chapter describes the approach used to develop a range of alternatives to be analyzed in the Draft Programmatic Environmental Impact Report (PEIR). The alternatives development process must include consideration of strategies for habitat creation and restoration with salinity control and different water surface configurations under a range of possible inflow conditions. The process also included consideration of methods to provide the maximum feasible attainment of the objectives described in Chapter 1, including:

- Restoration of long term stable aquatic and shoreline habitat for historic levels and diversity of fish and wildlife that depend on the Salton Sea;
- Elimination of air quality impacts from the restoration actions; and
- Protection of water quality.

### **DEVELOPMENT OF THE RANGE OF ALTERNATIVES FOR THE PEIR**

The California Environmental Quality Act (CEQA) requires that an Environmental Impact Report (EIR) describe a range of alternatives that would feasibly attain most of the objectives, and avoid or substantially lessen any significant effects. The range of alternatives should be selected and described in a manner to allow for public participation and informed decision making.

The CEQA Guidelines also describes the following factors that may be considered when defining feasible alternatives:

- Suitability of sites to be used for facilities;
- Economic viability;
- Availability of infrastructure;
- General plan consistency;
- Regulatory limitations;
- Regional jurisdictional boundaries; and
- Ability to legally acquire, control, or have access to the site for implementation.

These factors were considered to the greatest extent possible given the programmatic nature of the PEIR, as described below.

The PEIR evaluated potential concepts and the full range of alternatives with respect to general plan consistency; regulatory limitations; regional jurisdictional boundaries; and ability to legally acquire, control, or have access to the site for implementation. Detailed information would need to be collected and evaluated in project-level analyses to define specific sizes and locations of facilities in the preferred alternative.

### **ISSUES TO BE CONSIDERED IN THE PEIR**

Issues to be considered in the development of alternatives were specifically defined by the objectives as described in Chapter 1 and identified by Salton Sea Advisory Committee members and other stakeholders and members of the public, as described below. In addition, alternatives identified and evaluated in more than 20 studies completed over the past 40 years were reviewed to understand and consider technical and engineering issues identified in past studies, and physical, biological, and community related issues associated with the Salton Sea ecosystem.

## **Issues Identified by the Salton Sea Advisory Committee Members and Other Stakeholders**

The Salton Sea Advisory Committee identified a range of issues to be considered in development of the alternatives. The following issues were discussed at Salton Sea Advisory Committee meetings and public workshops:

- Protection and/or restoration of habitat for threatened or endangered species, including consideration of results of Biological Opinions developed as part of the Quantification Settlement Agreement (QSA), Coachella Valley Multiple Species Habitat Conservation Plan, and on-going efforts for development of Natural Community Conservation Plans;
- Consideration of the importance of the Salton Sea with respect to the Pacific Flyway;
- Consideration of unique habitats that cannot be specifically duplicated in other locations or that become unique due to the synergy between habitats at or near the Salton Sea, or because of the proximity to the Colorado River Delta;
- Approaches that reduce potential eco-risks due to selenium and nutrient concentrations that could accumulate in various habitats;
- Consideration of approaches that include adaptive management;
- Preservation of agricultural land that provides habitat in the watershed;
- Preservation of the Salton Sea for storage of agricultural runoff and seepage from irrigated lands in the Imperial and Coachella valleys;
- Protection of micro-climate that occurs along lands adjacent to the existing Salton Sea shoreline;
- Consideration of tribal interests at the Salton Sea and in the watershed;
- Consideration for integrating potential geothermal power generation;
- Focus the ecosystem restoration within the Salton Sea watershed;
- Implement air quality management methods for Exposed Playa;
- Assume land use general plans of Imperial and Riverside counties and the Torres Martinez Tribe would be fully implemented along the Salton Sea shoreline and throughout the watershed;
- Consideration for local recreational and economic development, especially opportunities that would do no harm or improve conditions; and
- Establishment of a long term monitoring and research program because many aspects of the Salton Sea ecosystem existing conditions are not understood or fully defined.

Similar issues were identified during the scoping process for this PEIR, as described in Appendix B.

## **Alternatives Considered in Previous Studies**

Previous studies identified and evaluated the following alternatives:

- Divide the Salton Sea with barriers across the Sea Bed (currently inundated area within the existing Salton Sea shoreline) or parallel to the existing shoreline to develop at least two water

bodies: Smaller Salton Sea on one side of the barrier with marine salinity and a Brine Sink on the other side of the barrier for salt disposal;

- Maintain a smaller Salton Sea at marine salinity and pump water to evaporation ponds. Locations of the evaporation ponds evaluated in previous studies varied from areas adjacent to the existing shoreline to dry lake beds located outside of the watershed. In some studies, evaporation rates were increased by using a process referred to as Enhanced Evaporation Systems that involved spraying or misting the water into the air. In some studies, solar ponds were considered to evaporate water and simultaneously generate electricity. Other studies evaluated conveyance of salt water to the existing geothermal generating power plants on the southeastern Salton Sea shoreline to be used either for cooling systems or injection into the groundwater;
- Pump water and salts from the Salton Sea to the upper portion of the Gulf of California or the Pacific Ocean along the Southern California coast. The studies also evaluated conveying marine water from the Gulf of California or the Pacific Ocean to the Salton Sea. Some of the studies evaluated hydropower generation as part of the conveyance facilities;
- Convey water by gravity from the Colorado River or pump recycled wastewater to the Salton Sea, and pump water and salts from the Salton Sea to solar ponds, evaporation ponds, or Pacific Ocean;
- Separate a portion of the Sea Bed with displacement dikes to provide freshwater or brackish water lakes and/or wetlands near the confluences of the New, Alamo, and Whitewater rivers or separate areas within the Sea Bed. Water and salts would be discharged to a Brine Sink or evaporation/solar ponds. In some studies, desalination was considered to improve water quality;
- Use a barrier in the Sea Bed to maintain a smaller Salton Sea and a separate Brine Sink. In some studies, most of the inflow was treated by desalination facilities and made available for transfer for municipal uses. Remaining land in the Sea Bed could be reclaimed for agriculture; and
- Maintain a smaller Salton Sea with hypersaline conditions and establish brackish wetlands near the confluences of the New, Alamo, and Whitewater rivers and along the existing shoreline.

Many of these alternatives were developed to provide salinity and elevation control to support recreational and local economic opportunities. Habitat and water quality improvements were considered for the purpose of supporting fish and wildlife that provided recreational opportunities. Silt and nutrient controls upstream of the Salton Sea and use of treatment wetlands were also included in many studies. The screening criteria for many studies limited the range of alternatives to those that could be financed by local communities either directly or through the sale of water to users located outside of the watershed.

## **DEVELOPMENT OF ALTERNATIVES FOR THIS PEIR**

A multi-step process was used for development of the final range of alternatives. This process began with the description of the No Action Alternative (Step 1). Objectives were developed as described in Chapter 1 (Step 2). General concepts were defined to meet the objectives (Step 3). The concepts were compared to broad screening criteria based upon legislative objectives, regulatory requirements, and technical feasibility. The concepts that met these broad screening criteria were further defined and referred to as configurations (Step 4). Initial engineering layouts and biological analyses were developed for each of the configurations and reviewed with the Salton Sea Advisory Committee and the public. The configurations were modified and additional configurations were developed based upon the comments. Configurations that were considered to be feasible based upon the objectives and legislative and regulatory compliance were identified as the final alternatives to be evaluated in the PEIR (Step 5).

## **Step 1: Description of the No Action Alternative**

The No Action Alternative is intended to reflect existing conditions at the time of the filing of the Notice of Preparation plus changes that are reasonably expected to occur in the foreseeable future if the action is not implemented, based on current plans. For the purposes of this PEIR, the terminology of No Action Alternative is equivalent to the CEQA terminology of No Project Alternative. A No Action Alternative will frequently include foreseeable projects and predictable actions, which are events and changes that are neither existing conditions nor impacts of the other alternatives. The No Action Alternative is based on projections of conditions that would occur if the other alternatives were not implemented. In the PEIR, the No Action Alternative will serve as one basis for comparison of other alternatives. The PEIR also describes the environmental setting for each resource (described in the document as Existing Conditions), and those Existing Conditions are used as another basis for comparison with each alternative.

The No Action Alternative was developed using the following process:

- Identification of existing projects and management policies that were implemented as of the date of issuance of the Notice of Preparation (NOP) for the PEIR, February 27, 2004;
- Identification of potential projects that have been considered for implementation within the study area, by Tribal, federal, State, regional and local agencies;
- Development and application of screening criteria for the No Action Alternative to identify projects that would be implemented without Salton Sea restoration actions considered in the PEIR alternatives; and
- Identification of changes to management policies that have been or would have been implemented after February 27, 2004 without Salton Sea restoration actions considered in the PEIR alternatives.

Projects included in the No Action Alternative-CEQA Conditions generally have secured agency approvals including mitigation measures and permit requirements and are not considered to be speculative in nature. Based upon these assumptions, the No Action Alternative-CEQA Conditions was developed to describe future conditions over the 75-year study period.

The 75-year study period includes a long planning horizon, and, therefore, the No Action Alternative-CEQA Conditions may not accurately reflect future conditions. A No Action Alternative-Variability Conditions was developed to reflect these future uncertainties. The No Action Alternative-Variability Conditions includes a wider range of projects and plans. It was important to consider future variability because if conditions change, it would be difficult to move or otherwise modify structures identified in the alternatives. Specific assumptions related to projects and plans included in the No Action Alternative-CEQA Conditions and No Action Alternative-Variability Conditions are described in Chapter 3.

Implementation of the projects included in the No Action Alternative would have an overall effect of reducing flows into the Salton Sea as compared to Existing Conditions, as described in more detail in Chapter 5. The historical average inflows from 1950 to 2002 were about 1,296,000 acre-feet/year. Average inflows over the study period of 2003 to 2078 could range from 964,500 acre-feet/year under the No Action Alternative-CEQA Conditions to 795,000 acre-feet/year under the No Action Alternative-Variability Conditions.

Changes in inflows would decrease the Salton Sea surface water elevation from -228 feet mean sea level (msl) under Existing Conditions to -248 and -260 feet msl under No Action Alternative-CEQA Conditions and No Action Alternative-Variability Conditions, respectively, by 2078. The reduction in inflows would increase salinity from 48,000 mg/L under Existing Conditions to 138,000 and

308,000 mg/L under No Action Alternative-CEQA Conditions and No Action Alternative-Variability Conditions, respectively, by 2078.

The value of the Salton Sea to fish and wildlife is dependent on the availability of water with salinity that supports viable forage populations. Future projections of declining inflows suggest that many of the areas that currently provide high value for birds (e.g., river deltas) would be in different locations as Salton Sea water recedes. Other features, such as snags and islands, would no longer function as the Salton Sea recedes and changes in water quality would influence the quality of habitat in many of these areas.

## Step 2: Identification of Objectives

The objectives were developed in coordination with the Salton Sea Advisory Committee and are based on the Fish and Game Code, the Water Code, and federal and State laws pertaining to protection of endangered and threatened species, water quality, and air quality:

- Restore long term stable aquatic and shoreline habitat for historic levels and diversity of fish and wildlife that depend upon the Salton Sea to a maximum feasible attainment level;
- Restore the Salton Sea ecosystem and provide permanent protection of wildlife dependent on that ecosystem;
- Protect water quality to support beneficial uses;
- Eliminate air quality impacts caused by implementation of ecosystem restoration to a maximum feasible attainment level;
- Protect special status species in accordance with federal and State endangered species acts;
- Protect water quality in accordance with the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) Water Quality Control Plan and other federal and State requirements; and
- Protect air quality in accordance with local air quality management districts' State Implementation Plans and other federal and State requirements.

## Incorporation of Comments

During the preparation of the PEIR, the objectives defined in Chapter 1 were discussed with the Salton Sea Advisory Committee, stakeholders, and the public to further define some of the terms, as follows:

- **Objective:** Restore long term stable aquatic and shoreline habitat for historic levels and diversity of fish and wildlife that depend upon the Salton Sea to a maximum feasible attainment level:
  - Historic levels and diversity was further defined as being based upon recent fish and wildlife conditions; and
  - Stable aquatic and shoreline habitat was further defined as being based upon a stable water surface area over the study period - but not necessarily upon a specific elevation (see Fish and Game Code Section 2081.7(e)(2)(A));
- **Objective:** Restore the Salton Sea ecosystem and provide permanent protection of wildlife dependent on that ecosystem:
  - The Salton Sea ecosystem was further defined to include the area within the Salton Sea; rivers, creeks, and drains tributary to the Salton Sea; and agricultural lands near the Salton Sea; and

- Permanent protection was further defined to include reliability during and after substantial seismic or climatological events;
- **Objective:** Protect water quality to support beneficial uses. Water quality to support beneficial uses was further defined to:
  - Provide areas with salinity of 30,000 to 40,000 mg/L that would sustain historic diversity of aquatic organisms;
  - Provide areas of water with salinity of 20,000 to 30,000 mg/L. Water with salinity less than 20,000 mg/L would not be included in the alternatives because lower salinity would increase the potential for avian disease, mosquito populations, selenium ecorisk, and nuisance vegetation;
  - Provide areas with salinity of 40,000 to 200,000 mg/L which represents the salinity at which most of this historic fish could not be supported, however, a productive ecosystem of tilapia, desert pupfish, and some invertebrates could be supported;
  - Reduce the effects of nutrients that could cause eutrophication; and
  - Reduce the effects of selenium that can cause health risks to fish, wildlife, and humans;
- **Objective:** Eliminate air quality impacts caused by implementation of the restoration actions to a maximum feasible attainment level:
  - Air quality impacts were further defined to include air quality problems that could occur during construction and operations and maintenance.

### Step 3: Development of Concepts

Historic habitats included a marine salinity water body (Salton Sea) with brackish water estuaries at the confluences of rivers, creeks, and drains, as described in Appendix H-1. To restore or recreate these habitat functions and values, general concepts were developed. The concepts do not include details of locations, sizes, or specific facilities such as methods to comply with air quality management requirements. These issues were addressed in Step 4, Development of Configurations.

Objectives identified in Step 2 were further defined in this step through discussions with the Salton Sea Advisory Committee. Based upon the comments, the following guidelines were developed to define the concepts:

- Restoration actions inside the Sea Bed to support historic habitat functions and values would provide water with marine salinity (30,000 to 40,000 mg/L), promote habitat diversity by maintaining a mosaic of habitat types with salinity from 20,000 to 200,000 mg/L, including functions and values of the estuaries, and habitat complexity by providing water in some areas with depths greater than 6 feet. To provide a range of alternatives, some concepts include water bodies with salinity in the entire range and other concepts only included salinity ranging from 20,000 to 40,000 mg/L;
- Compliance with water quality regulations to support beneficial uses of habitats;
- Compliance with endangered species regulations, including a water body to provide a connection between the drains and creeks to exchange genetic material for desert pupfish;
- Restoration actions outside the Sea Bed to support wildlife that are dependent upon the restored Salton Sea would be consistent with local conservation plans and identical or similar for all alternatives; and

- Restoration actions would be developed to promote flexibility to allow for future changes in habitat conditions and status of individual species, and to incorporate information generated by monitoring programs to reduce future uncertainties and provide a scientific basis for future adaptive management.

Using these guidelines, the following concepts were identified:

- **Whole Sea Concepts**
  - Import water to the Salton Sea to maintain a stable water surface elevation throughout the Sea Bed with areas of deep water and estuarine conditions at the confluences with the rivers, creeks, and drains;
  - Saltwater disposal outside of the Sea Bed to maintain marine salinity; and
  - Pupfish connectivity between the drains and/or creeks would occur in the Whole Sea;
- **Partial Sea Concepts**
  - Divide the Sea Bed with one or more barriers to maintain waters with brackish water quality and/or marine water quality, and depending upon the location of the water body, existing areas of deep water would be maintained;
  - Saltwater disposal either in a Brine Sink within the Sea Bed or outside of the Sea Bed; and
  - Pupfish connectivity between the drains and/or creeks could occur in the Partial Sea, depending upon the location of the water. If a drain or creek does not enter the Partial Sea, then a separate water body could be provided to connect the drains and/or creeks;
- **Shallow Saline Habitat Concepts**
  - Construct cells on the Sea Bed with multiple berms to maintain waters with varying depths and salinities to represent habitat functions and values of shoreline, estuarine, and marine sea areas. For example, salinity in some cells could range from 20,000 to 60,000 mg/L, and salinity of other cells could range from 60,000 to 200,000 mg/L;
  - Saltwater disposal either in a Brine Sink within the Sea Bed or outside of the Sea Bed; and
  - Pupfish connectivity between the drains and/or creeks could occur in the Shallow Saline Habitats depending upon the locations of the cells and the adjacent drains or creeks. If a drain or creek does not enter the Shallow Saline Habitat, then a separate water body could be provided to connect the drains and/or creeks;
- **Saltwater Disposal Concepts**
  - Evaporation pond within the Sea Bed;
  - Evaporation ponds outside of the Sea Bed, including use of dry lake beds;
  - Groundwater injection to deep aquifers; and
  - Export to the Gulf of California or Pacific Ocean.

## **Whole Sea Concepts**

The Whole Sea concepts would require an imported water supply to replace the water that evaporates. If saltwater is removed from the Whole Sea to maintain a marine salinity, imported water would have increase to replace the saltwater removed from the Whole Sea.

Several water supply options were considered, including diversion of water from the Colorado River, Gulf of California, Pacific Ocean, and recycled wastewater. These options are summarized below.

### ***Import Water from the Colorado River***

This concept has been considered in previous studies. The water would be acquired from the lower Colorado River within the United States and conveyed to the Whole Sea through the New and Alamo rivers and/or Imperial Irrigation District (IID) canals. Saltwater would need to be removed from the Whole Sea if salinity was stabilized at 30,000 to 40,000 mg/L. Less imported water would be required if the salinity was not stabilized. The total amount of water to be imported would be equal to the amount of water that would evaporate plus the saltwater removed, if any, as shown in Table 2-1. The amount of imported water presented in Table 2-1 assumes inflows described under the No Action Alternative conditions after reductions that occur after 2017.

**Table 2-1  
Required Imported Water from Colorado River to Maintain a Whole Sea**

<b>Inflow Assumptions from Salton Sea Watershed</b>	<b>Salinity Control</b>	<b>Whole Sea Salinity in 2078</b>	<b>Inflow Imported from Colorado River</b>	<b>Evaporation Ponds</b>
Per No Action Alternative-CEQA Conditions	Yes	30,000 to 40,000 mg/L	428,000 acre-feet/year after 2017	15,600 acres
	No	77,000 mg/L	341,000 acre-feet/year after 2017	Not needed
Per No Action Alternative-Variability Conditions	Yes	30,000 to 40,000 mg/L	721,000 acre-feet/year after 2017	14,700 acres
	No	74,000 mg/L	634,000 acre-feet/year after 2017	Not needed

All values assume Whole Sea surface water elevation of -230 feet msl.

If salinity is managed for a range of 30,000 to 40,000 mg/L, saltwater disposal would be required. Saltwater disposal concepts are described below, including evaporation ponds. Table 2-1 includes the surface area that would be required for evaporation ponds, however, other methods also could be used.

This concept would require surplus water that could be purchased and conveyed to the Whole Sea, and a change in authorized uses of Colorado River water for fish and wildlife uses. The use of Colorado River water is governed by a complex assortment of federal and state laws, interstate compacts, an international treaty, court decisions, federal contracts, federal and state regulations, and multi-party agreements which together are commonly referred to as the Law of the River. In 1928, Congress enacted the Boulder Canyon Project Act, which authorized the Secretary of the Interior to construct Hoover Dam and other facilities, and to contract for the delivery and use of water from these facilities for irrigation and domestic uses. In 1964, the Supreme Court of the United States issued *Arizona v. California*, apportioning lower Colorado River water controlled by the United States to the states of Arizona, California, and Nevada. The Colorado River Basin Project Act of 1968 provided for a wider range of uses of Colorado River water for some users, including improving conditions for fish and wildlife. However, the expansion of authorized uses did not include areas served by the All-American Canal, such as the service areas of IID and Coachella Valley Water District (CVWD). Areas served by the All-American Canal only can use Colorado River water for irrigation and domestic uses. Under the Decree, the Secretary of the Interior is required to determine when normal, surplus, and shortage conditions occur on the lower Colorado River. Specific guidelines have been established for the Secretary of the Interior to declare a surplus condition for the period of 2002 to 2016 in the Interim Surplus Guidelines. It is unknown if surplus water would become available in the future, but this is not expected to occur frequently if at all. In addition, such a surplus could not be directly delivered to the Whole Sea for the benefit of fish and wildlife since this use is not authorized for areas served by the All-American Canal.

This concept also would require agreements with IID to convey water to the Whole Sea from the Colorado River.

### ***Import Water from the Gulf of California***

Importation of water from the Gulf of California also has been considered in previous studies. This water supply would require construction of conveyance facilities from the Gulf of California to import water and construction of saltwater disposal facilities, such as evaporation ponds or conveyance facilities to the Gulf of California.

As described above for the previous Whole Sea concept, the amount of imported water would need to be adequate to replace the evaporated water and the saltwater removed to maintain salinity. To provide a Whole Sea with a stable salinity and to maintain a stable water surface elevation of -230 feet msl, about 3,400,000 acre-feet/year would need to be imported and 2,730,000 acre-feet/year would need to be removed. The amount of imported water would be based upon the salinity of the Gulf of California and the Whole Sea when the conveyance facilities become operational. The facilities probably would not be designed, permitted, and constructed before 2020. At that time, the salinity of the Whole Sea would be 76,000 mg/L. The Gulf of California salinity ranges from 37,000 to 39,000 mg/L. Because the Gulf of California water salinity is relatively high, the projected salinity of the Whole Sea would be 44,000 mg/L in 2078. This salinity is greater than marine water salinity and would not support the defined habitat objectives described in previous sections of this chapter. These flows are almost 40 times higher than flows described above for importation of Colorado River because more water with salinity of 37,000 to 39,000 mg/L would be required to dilute the Whole Sea salinity than Colorado River water with salinity of 500 to 1,500 mg/L.

In 1993, Mexico identified the Upper Gulf of California to be a Biosphere Reserve (Brusca et al, 2001). In 1995, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Man and Biosphere Program (MAB) designated the Upper Gulf of California/Colorado River Delta as a Biosphere Reserve to reduce biodiversity loss, improve links between cultural and biological diversity, and provide environmental sustainable conditions around the reserve. More specifically, the designation by Mexico protected fisheries in the Upper Gulf of California. In 2005, UNESCO designated areas of the Gulf of California as a World Heritage Site, including the Upper Gulf of California/Colorado River Delta Biosphere Reserve Islands of the Gulf of California, Isla San Pedro Martir, El Vizcaino Biosphere Reserve, Bahia de Loreto National Park, Cabo Pulmo National Marine Park, Cabo San Lucas, Islas Marias Biosphere Reserve, and Isla Isabel National Park (UNESCO, 2005). This designation is to encourage preservation of natural and cultural heritage.

Construction and operations and maintenance of water diversion and conveyance facilities for an alternative to Import Water from the Gulf of California would require compliance with water rights, water quality, and environmental regulations in Mexico. To protect the Biosphere Reserve, the conveyance facilities would need to extend to the lower portion of the Gulf of California. This would result in longer conveyance facilities than have been evaluated in previous studies.

Water diverted from the Gulf of California would need water treatment prior to discharge into the Whole Sea to reduce the risk of introduction of new organisms or constituents.

### ***Import Water from the Pacific Ocean***

Importation of water from the Pacific Ocean is similar in concept to importation of water from the Gulf of California. The salinity of the Pacific Ocean along the San Diego County coastline ranges from 33,000 to 35,000 mg/L. To provide a Whole Sea with a stable salinity and stable water surface elevation of -230 feet msl, about 3,400,000 acre-feet/year would be imported and 2,730,000 acre-feet/year would be removed. The salinity would stabilize at about 40,000 mg/L.

Diversion of water from the Pacific Ocean would require compliance with provisions of the State Water Resources Control Board, State Lands Commission, California Coastal Conservancy, California Coastal Commission, Department of Fish and Game (DFG), U.S. Environmental Protection Agency, and potentially others. These regulatory agencies require that facilities avoid adverse impacts to physical and biological resources, especially the aquatic habitat. Recent evaluations for water supply diversion facilities along the Pacific Ocean coast have required substantial mitigation measures to avoid impacts to benthic organisms and water quality.

The primary locations considered in previous studies for diversion of water from the Pacific Ocean were along the San Diego County coast. There are extensive portions of the San Diego County coast that are protected in preserves, including:

- Buena Vista Lagoon State Ecological Reserve and proposed Agua Hedionda Lagoon State Ecological Reserve located near Encinitas;
- Batiquitos Lagoon and San Elijo Lagoon Ecological Reserve located north of Del Mar;
- Mission Bay Preserve;
- San Diego National Wildlife Refuge and Sweetwater Marsh National Wildlife Refuge near San Diego; and
- Tijuana River National Estuarine Research Reserve and Tijuana Slough National Wildlife Refuge along the southern San Diego County coastline.

To avoid these areas, the intake probably would be located near Camp Pendleton in northern San Diego County. Portions of Camp Pendleton include habitats occupied by endangered or threatened species. However, at this time, there are no protected ocean areas along the coastline adjacent to Camp Pendleton.

Conveyance facilities would extend from the Imperial and Coachella valleys to the Pacific Ocean. Several routes evaluated in previous studies paralleled Interstate 10 and State Highway 78.

Water diverted from the Pacific Ocean would need to undergo water treatment prior to discharge into the Whole Sea. This would reduce the risk of introduction of new organisms or constituents from the ocean.

### ***Import Recycled Wastewater from Riverside and San Bernardino Counties***

Currently, wastewater effluent from the Imperial and Coachella valleys flows into the Salton Sea. Additional wastewater effluent could be conveyed from communities in western Riverside and San Bernardino counties. The required amount of water would be similar to that described under the Import Water from the Colorado River concept and could range from 428,000 to 721,000 acre-feet/year to provide a stable salinity of 30,000 to 40,000 mg/L depending upon the amount of inflow.

Existing wastewater flows from western Riverside and San Bernardino counties are about 340,000 acre-feet/year. It is projected that future wastewater flows from this area could be 500,000 acre-feet/year by 2040 (Reclamation, 2004). Many of the communities already recycle wastewater effluent. It is anticipated that by 2040, more than 50 percent of the wastewater effluent would be recycled in the local communities. In addition, the water and wastewater agencies are pursuing rigorous water conservation efforts that could further reduce wastewater flows. Therefore, the available recycled water flows for the Whole Sea may be less than the 428,000 to 721,000 acre-feet/year of needed imported water. Transfer of the water to the Whole Sea could only occur if there were no adverse impacts on communities that use the wastewater effluent.

The wastewater treatment facilities are located relatively uniformly over Riverside and San Bernardino counties. Therefore, effluent would need to be collected from all of the treatment plants and conveyed to one location for subsequent conveyance to the Whole Sea.

### **Partial Sea Concepts**

The Partial Sea concepts would include a water body with salinity ranging from 20,000 to 40,000 mg/L. This water body would be located in only part of the Sea Bed and would be formed by one or more barriers. Previous studies have evaluated locations of the Partial Sea in the northern and southern portions of the Sea Bed. The size of the Partial Sea varied depending upon inflows and inflow reliability, location of barriers or dams that form the Partial Sea, and other uses of inflows.

Saltwater disposal would be required to maintain the specified salinity in the Partial Sea. The saltwater disposal site could be located within or outside of the Sea Bed.

This concept would result in Exposed Playa on a portion of the Sea Bed. As described above, one of the objectives would be to manage air quality issues in each of the alternatives. Therefore, the Partial Sea concepts would require Air Quality Management of Exposed Playa that is not overlain by water or other facilities.

During the initial phases of the PEIR preparation, several Partial Sea concepts were developed. Previously, the Salton Sea Authority had developed a concept that included a Partial Sea in the northern, western, and southern portions of the Sea Bed. Concurrently with the preparation of the PEIR, the Salton Sea Authority continued to refine this concept. At the same time, the Imperial Group developed a concept that would include one or more concentric berms parallel to the shoreline to contain several Partial Sea water bodies.

### **Shallow Saline Habitat Concepts**

The Shallow Saline Habitat concepts would include shallow water bodies with salinity ranging from 20,000 to 200,000 mg/L. The water bodies would be located on part of the Sea Bed and would be formed by low-height berms. Initially, it was discussed that the salinity in this habitat could be less than 20,000 mg/L. However, during the preparation of the PEIR, it was determined that salinity less than 20,000 mg/L could lead to a high potential for freshwater mosquitoes, excessive growth of vegetation that would require a high maintenance effort, increased selenium ecorisk, and inability to support marine sport fish that have been present in the Salton Sea in recent years, as described in Appendix H-1. Salinity of 20,000 to 200,000 mg/L would reduce these risks and support fish and wildlife that have been present in recent years.

The Shallow Saline Habitats could be constructed to contain a wide range of water bodies with different depths, salinity, or habitat features such as islands or snags. The focus of these concepts would be to minimize the infrastructure to provide habitat functions and values. These areas are referred to as Saline Habitat Complex areas. The size of the Saline Habitat Complex area would vary depending upon inflows, inflow reliability, and availability of land that could provide shallow water. Therefore, Saline Habitat Complex could not be located on steep slopes because the amount of shallow water would be limited or not available.

This concept is currently being evaluated by the U.S. Department of the Interior, Geological Survey as a pilot project on the southeastern Salton Sea shoreline. The water bodies could be similar to managed brackish water habitats that are developed in the San Joaquin Valley to support large bird populations amongst the agricultural fields.

Saltwater disposal would be required to maintain specified salinity in the Saline Habitat Complex cells. The saltwater disposal site could be located within or outside of the Sea Bed. However, because this

concept was developed to minimize infrastructure, it is assumed that the saltwater disposal site would be located within the Sea Bed.

This concept would result in Exposed Playa on a portion of the Sea Bed. As described above, one of the objectives would be to manage air quality issues in each of the alternatives. Therefore, the Shallow Saline Habitat concept would require Air Quality Management of Exposed Playa that is not overlain by water or other facilities.

### **Saltwater Disposal Concepts**

To maintain salinity for the Whole Sea, Partial Sea, and/or Shallow Saline Habitat concepts, a portion of the water containing salts would need to be diverted from the water bodies for disposal. If salt disposal does not occur, the salinity would continue to increase in the water bodies.

#### ***Evaporation Ponds Within the Sea Bed***

Under the Partial Sea and Shallow Saline Habitat concepts, only a portion of the Sea Bed would be used for the managed habitats and water bodies. All or a portion of the remaining area could be used as an evaporation pond for the disposal of saltwater diverted from the Partial Sea or Shallow Saline Habitats. The evaporation pond, or Brine Sink, would be characterized by salinity of more than 40,000 mg/L and would become more saline over time as the salts accumulate and the water evaporates. Salinity in the Brine Sink would exceed 350,000 mg/L by 2078 in some concepts.

To minimize infrastructure and related maintenance issues, saltwater would flow by gravity to the Brine Sink that would be located at the lowest elevations in the Sea Bed. The size of the Brine Sink would be different in each concept.

#### ***Evaporation Ponds Outside the Sea Bed***

Under the Whole Sea and Partial Sea concepts, saltwater could be diverted into an evaporation pond located outside of the Sea Bed. The evaporation pond would function in a similar manner as described above for evaporation ponds within the Sea Bed.

The evaporation pond outside of the Sea Bed would require conveyance facilities that would pump water from the Whole Sea and Partial Sea in a canal or pipeline to the evaporation ponds. Evaporation pond locations identified and evaluated in previous studies have ranged from areas adjacent to the Salton Sea to dry lake beds in neighboring watersheds.

Typically, evaporation ponds used for wastewater disposal are constructed with berms at least 5 feet high and bottom slopes of less than 2 percent. The size of the evaporation ponds could range from 25 acres for small Partial Seas to over 450,000 acres for Whole Seas, depending upon the amount of saltwater and the height of the berms. The evaporation ponds must be constructed with soils that are relatively impermeable to protect adjacent land uses and groundwater. Therefore, it could be necessary to import soils if the local soils are permeable due to high concentrations of sand and/or other coarse grained materials. Previous studies have evaluated the use of enhanced evaporative systems to reduce the size of the evaporation ponds. However, the results of those studies indicated that the operations and maintenance efforts would be extensive (Salton Sea Authority et. al., 1997; Reclamation, 2004).

#### **Evaporation Pond Sites Near the Sea Bed**

Potential evaporation pond locations adjacent to the Sea Bed could be limited due to existing land uses. On the western and eastern shorelines, the land is either within communities, owned by the federal government, or characterized by slopes greater than 5 percent. On the northern shoreline, the land is either within communities or part of the Torres Martinez Tribal Lands. Agricultural lands along the southern

shoreline would require conversion of agricultural land, including lands that are considered to be Prime Farmland or Farmland of Statewide Importance.

### **Evaporation Pond Sites at Dry Lake Beds**

Evaporation ponds located at dry lake beds were evaluated in previous studies for Palen, Clark, and Ford lakes (Salton Sea Authority et. al., 1997). All three sites would require extensive conveyance and pumping because the lake beds are located at elevations above mean sea level. Use of these dry lakes would probably be limited due to habitat protection requirements at the site or along the conveyance route.

Palen Dry Lake and Ford Dry Lake are located in Riverside County along Interstate 10 near Desert Center. Both areas have been recently closed to livestock grazing by the U.S. Department of the Interior, Bureau of Land Management (BLM) in compliance with a 2005 Biological Opinion for the California Desert Conservation Area Plan to promote the conservation of desert bighorn sheep (Service, 2005). The BLM also closed playas and sand dunes at Palen Dry Lake, Palen Dry Lake Dunes, Ford Dry Lake, and Ford Dry Lake Dunes to vehicle use to protect desert tortoise non-critical habitat. Palen Dry Lake and Ford Dry Lake also provide habitat for the Mojave fringe-toed lizard, a species of concern. These habitat issues would probably preclude flooding of the lake beds for evaporation ponds.

Clark Dry Lake is located in San Diego County near Anza-Borrego Desert State Park and is smaller than Palen and Ford lakes. This area does not have a specific habitat designation but use of it would include conveyance routes across the State Park.

### ***Groundwater Injection to Deep Aquifers***

Saltwater from the Salton Sea could not be discharged or injected into the upper aquifers that are used for potable and agricultural water supplies due to the high salinity. Previous studies have evaluated injection of groundwater into the very deep aquifers in the same manner as the re-injection of brine flows from the geothermal power plants. The power plants re-inject the brine from steam into wells that are over one mile deep. Previous studies have indicated that the geological formations near the Salton Sea may not have adequate permeability to accept flows from the Salton Sea (Salton Sea Authority et. al., 1997). In addition, the geothermal development balances the withdrawal of steam with the injection of brine to avoid cooling the high temperatures in the geothermal field. Previous studies have indicated that it is not known if injection of additional saltwater could cause cooling of the geothermal field (Salton Sea Authority et. al., 1997). However, a pilot study is planned by Reclamation to investigate this.

### ***Export to the Gulf of California or Pacific Ocean***

Export of saltwater to the Gulf of California or Pacific Ocean would require conveyance and compliance with water quality requirements similar to those described under the Whole Sea concepts.

Discharge of the water to the Gulf of California would require compliance with water rights, water quality, and environmental regulations in Mexico, including protections under UNESCO. In addition, the water discharged to the Gulf of California would need to undergo treatment to prevent contamination by new organisms and water quality constituents.

Discharge to the Pacific Ocean would require compliance with provisions of the State Water Resources Control Board, State Lands Commission, California Coastal Conservancy, California Coastal Commission, DFG, U.S. Environmental Protection Agency, and potentially others. These regulatory agencies require that facilities avoid adverse impacts to physical and biological resources, especially the aquatic habitat. Recent evaluations on existing and projected outfalls along the Pacific Ocean coast have required substantial mitigation measures to avoid impacts to benthic organisms and water quality conditions including very long outfalls to avoid impacts to the shoreline.

## Application of Broad Screening Criteria to Range of Concepts

Broad screening criteria were identified as compliance with legislation and regulatory requirements, and technical feasibility based upon preliminary analyses. The results of the application of the broad screening criteria are presented in Table 2-2.

**Table 2-2**  
**Results of the Application of Broad Screening Criteria to Range of Concepts**

Concept	Comments	Screening Results
Whole Sea Concept - Import Water from the Colorado River	Under the Law of the River, water could not be used for fish and wildlife purposes in the Salton Sea. In addition, surplus water is not likely to be available in the future.	Eliminated from further analysis.
Whole Sea Concept - Import Water from the Gulf of California	<p>This concept would require: 1) compliance with water quality and environmental protection regulations adopted by the United States, California, and Mexico; and 2) agreements between the United States and Mexico for construction and operations and maintenance of facilities in Mexico.</p> <p>This concept does not appear to meet the broad screening criteria based upon regulatory requirements. However, this alternative was identified during Scoping and Public Outreach meetings as an alternative that the public wanted to be considered in more detail in Step 4.</p>	To be considered in more detail.
Whole Sea Concept - Import Water from the Pacific Ocean	<p>This concept would require compliance with water quality and environmental protection regulations adopted by the United States and California. Due to environmentally protected areas along the San Diego County coast, the most appropriate area for an intake may be near Camp Pendleton.</p> <p>This concept does not appear to meet the broad screening criteria based upon regulatory requirements. However, this alternative was identified during Scoping and Public Outreach meetings as an alternative that the public wanted to be considered in more detail in Step 4.</p>	To be considered in more detail with an outfall near Camp Pendleton.
Whole Sea Concept - Recycle Wastewater from Riverside and San Bernardino Counties	The amount of water available from recycled wastewater in western Riverside County and San Bernardino County is projected to not be adequate for the Whole Sea Concept. Therefore, this alternative is considered not to be technically feasible.	Eliminated from further analysis.
Partial Sea Concept	This concept appears to be technically feasible based upon analysis in Step 3.	To be considered in more detail.
Shallow Saline Habitat Concept (Saline Habitat Complex)	This concept appears to be technically feasible based upon analysis in Step 3.	To be considered in more detail.
Saltwater Disposal Concept - Evaporation Ponds (Brine Sink) within the Sea Bed	<p>This concept appears to be technically feasible based upon analysis in Step 3.</p> <p>Could not be used with Whole Sea concepts.</p>	To be considered in more detail with Partial Sea and Shallow Saline Habitat configurations.

**Table 2-2**  
**Results of the Application of Broad Screening Criteria to Range of Concepts**

Concept	Comments	Screening Results
Saltwater Disposal Concept - Evaporation Ponds outside the Sea Bed - Adjacent to the Salton Sea	This concept would require acquisition of more than 100 acres, probably of agricultural land.	<p>This concept could be developed in accordance with regulations along the southern shoreline. However, the availability of the land is not certain at this time and could reduce lands designated as Prime Farmland or Farmland of Statewide Importance. This area could be used for Whole Sea concepts. However, the only Whole Sea concepts considered for further analysis involve importation of water from the Gulf of California or Pacific Ocean. These concepts could more easily incorporate export facilities than Evaporation Ponds along the southern shoreline. Therefore, this saltwater disposal concept was eliminated from further analysis for the Whole Sea concepts.</p> <p>For the Partial Sea and Shallow Saline Habitat concepts, use of Evaporation Ponds outside the Sea Bed would require more infrastructure; land acquisition, as described above; and an increased need for Air Quality Management on Exposed Playa on the Sea Bed. Therefore, this saltwater disposal concept was eliminated from further analysis for the Partial Sea and Shallow Saline Habitat concepts.</p>

**Table 2-2**  
**Results of the Application of Broad Screening Criteria to Range of Concepts**

Concept	Comments	Screening Results
Saltwater Disposal Concept - Evaporation Ponds outside the Sea Bed at Dry Lakes	Palen Dry Lake and Ford Dry Lake have been designated for the protection of threatened or endangered species and conveyance facilities to use Clark Dry Lake would need to cross areas that may be subject to environmental protections.	<p>This concept could be developed in accordance with regulations assuming that the potential impacts to threatened and endangered species could be mitigated. This area could be used for Whole Sea concepts. However, the only Whole Sea concepts considered for further analysis involve importation of water from the Gulf of California or Pacific Ocean. These concepts could more easily incorporate export facilities than Evaporation Ponds outside the Sea Bed. Therefore, this saltwater disposal concept was eliminated from further analysis for the Whole Sea concepts.</p> <p>For the Partial Sea and Shallow Saline Habitat concepts, use of Evaporation Ponds outside the Sea Bed would require more infrastructure; land acquisition, as described above; and an increased need for Air Quality Management on Exposed Playa on the Sea Bed. Therefore, this saltwater disposal concept was eliminated from further analysis for the Partial Sea and Shallow Saline Habitat concepts.</p>
Saltwater Disposal Concept - Groundwater Injection	Previous studies have indicated that geologic formations near the Salton Sea may not have the appropriate permeability to be used for extensive groundwater injection of saltwater. In addition, it is not known if this action would cause cooling of the geothermal fields.	Eliminated from further analysis. If proposed pilot studies indicate that this concept is feasible, groundwater injection could be analyzed in project-level analyses.
Saltwater Disposal Concept - Export to the Gulf of California or Pacific Ocean	<p>Saltwater disposal in the Gulf of California would require compliance with water quality and environmental protection regulations adopted by the United States, California, and Mexico, and agreements between the United States and Mexico.</p> <p>Saltwater disposal in the Pacific Ocean would require compliance with water quality and environmental protection regulations adopted by the United States and California.</p>	<p>This concept would most appropriately be used in conjunction with Whole Sea concepts using Importation of Water from the Gulf of California or Pacific Ocean.</p> <p>For the Partial Sea concept, this saltwater disposal concept would increase the amount of infrastructure as well as the complexity of construction and operations and maintenance.</p> <p>To be considered in more detail with the Whole Sea concepts that Import Water from the Gulf of California and/or Pacific Ocean.</p>

## Step 4: Development of Configurations

Concepts that were retained for further analysis following application of broad screening criteria were defined in more detail and are referred to as configurations. The detailed descriptions were presented to the Salton Sea Advisory Committee, Working Groups, and the public in a series of meetings. Screening criteria based upon the requirements of legislation, regulations, and CEQA were applied to the configurations to define the final range of alternatives.

The configurations identified in Step 3 are listed below:

- Import-Export Water from and to the Gulf of California;
- Import-Export Water from and to the Pacific Ocean;
- Partial Sea configurations with Brine Sink within the Sea Bed; and
- Saline Habitat Complex with Brine Sink within the Sea Bed.

### Import-Export Water from and to the Gulf of California

The purpose of this configuration is to provide a Whole Sea configuration that maintains a stable water surface elevation at -230 feet msl and a stable salinity. Under either the No Action Alternative-CEQA Conditions or the No Action Alternative-Variability Conditions, the amount of inflows are not adequate to maintain a Whole Sea at a water surface elevation of -230 feet msl without imported water. To provide a stable water surface elevation and stable salinity, about 3,400,000 acre-feet/year of water would need to be imported and about 2,700,000 acre-feet/year of saltwater would need to be exported for inflows described under the No Action Alternative-Variability Conditions. This large amount of water would be required to provide a salinity of 44,000 mg/L in the Whole Sea. It is not possible to reduce the salinity further due to the water quality in the Gulf of California, as described above under the Whole Sea concept.

The following subsections describe the conveyance and treatment requirements for the Import-Export from and to the Gulf of California.

#### ***Conveyance Facilities***

This configuration would include the construction of multiple pipelines and/or canals and pumping plants to convey water. Conveyance facilities between the Whole Sea and the Gulf of California could be located along several routes described in previous studies. Inlet and outlet structures would need to be separated by a significant distance to prevent export water from being recycled into the inlet structures. The structures could be located on opposite sides of the Gulf of California or be separated by several miles. For the purposes of this configuration, it is assumed that the structures would be located on the same side of the Gulf of California to minimize impacts to the environment and communities from construction of the conveyance facilities.

Routes evaluated in previous studies were considered for this configuration. One route would be located west of the New River, cross the United States-Mexico border west of Calexico-Mexicali, continue along a route between Laguna Salada and Highway 5, and connect to the Gulf of California south of the Biosphere Reserve near San Felipe (Reclamation, 1998). This route would be about 178 miles in length. Another route considered in the same study would continue along the eastern shoreline of the upper portions of the Gulf of California to the El Golfo de Santa Clara and would be about 218 miles in length. Both routes would include a combination of canals in areas with gravity flows and pipelines for pressurized flows to convey the water over the pass in the Sierra Cucapa Mountains for both import and export facilities and from the low elevations of the Salton Sea for the export facilities. To import water from the Gulf of California to the Salton Sea using the western route, the following conveyance facilities would be required: up to four pumping plants with capacities of 4,700 cubic feet/second if the pumps operated 24 hours/day, 74 miles of eight pipelines with outside diameters of about 15 feet, and 104 miles

of a large canal. To export water from the Whole Sea to the Gulf of California using the western route, the following facilities would be required: up to five pumping plants with capacities of 3,800 cubic feet/second, 74 miles of six pipelines with outside diameters of about 15 feet, and 104 miles of canals with water depths and widths of about 10 feet and 100 feet, respectively.

A recent news release of a study described construction of a canal between San Felipe and Laguna Salada to extend the waters of the Gulf of California into Laguna Salada as part of a power generation project called the Montague Tidal Project (Proyecto Nacional Mexico Tercer Milenio, 2004). A similar concept was described in previous studies (Salton Sea Authority et. al., 1997). Laguna Salada is located at an approximate elevation of -33 feet msl. Use of Laguna Salada as part of the canal either would require construction of barriers around the basin to contain the saltwater or flooding of the basin to an elevation of 0 feet msl. The news release also described extension of a canal to Mexicali which is located at an elevation of 72 feet msl. If the canal is used for water conveyance, there would need to be at least one pumping plant to raise the water. If the canal is used for a ship channel, there would need to be at least one set of locks. If this facility was constructed, it could also be used to convey water into Imperial County near Calexico. A canal could extend from Calexico to the Salton Sea. The canal would need to be at least 10 feet deep and 100 feet wide to import water into the Salton Sea. A separate canal would need to be constructed from the Salton Sea to the Gulf of California for export of saltwater. The export water could not be discharged near the inlet of the channel that connected the Gulf of California to Laguna Salada to avoid recycling of high salinity water from the Salton Sea. Therefore, the export conveyance would probably consist of both pipelines and a canal, as described above.

All conveyance routes would require agreements with Mexico and local agencies in Mexico to provide access for construction and operations and maintenance of the facilities. If the routes would be located along sensitive environmental corridors, mitigation measures could be required, such as restoration of several times the amount of disturbed land to protect sustainable environments. Methods that would be used to develop mitigation measures in Mexico were not determined at the time of the preparation of the PEIR.

Power would be required in both the United States and Mexico for the pumping facilities. However, some electrical power needs could be recovered by hydropower generators located along the conveyance channels.

Inlets would be constructed with fish protection structures to avoid entraining and entrapping fish and other organisms. Inlet structures of over a mile in length probably would be required to divert about 9,200 acre-feet/day (3 billion gallons/day).

Outlet structures would be constructed with diffusers to provide adequate dilution and mixing. These structures would also be over a mile in length with capacities of about 7,700 acre-feet/day (2.5 billion gallons/day).

### ***Treatment Facilities***

Water treatment facilities would be required for both import and export flows to avoid introduction of new species into either the Gulf of California or the Salton Sea. The purpose of the treatment facilities would be to remove organisms and nutrients from the water without changing the salinity. Secondary wastewater treatment facilities could be used to achieve these water quality goals. The water treatment facilities could be located near the Sea or in southern Imperial County near the United States-Mexico border to allow operations and maintenance activities to occur within the United States. The capacity of the treatment facilities would be 9,200 acre-feet/day (3 billion gallons/day) for the import water and 7,700 acre-feet/day (2.5 billion gallons/day) for the export water. Additional facilities would be required for disposal of the materials and organisms removed from the water.

### ***Habitat Benefits of the Whole Sea***

Salinity in the Whole Sea under this configuration would be similar to Existing Conditions because the stabilized salinity would be 44,000 mg/L. There would be estuarine conditions near the confluences of the New, Alamo, and Whitewater rivers.

Under Existing Conditions, desert pupfish can move between the drains and creeks in the Salton Sea. Under the Whole Sea configurations, this type of desert pupfish connectivity would continue.

The inlet and outlet structures would be designed to minimize or eliminate adverse impacts to the environment in the Gulf of California and in the Whole Sea. The conveyance facilities also would be designed with appropriate mitigation measures, such as restoration of mitigation lands, to minimize or eliminate adverse impacts to the environment.

### ***Air Quality Management***

Construction activities along the conveyance corridor would require air quality management measures to reduce dust and emissions from vehicles. However, it is anticipated that these impacts could not be fully mitigated with existing or foreseeable technology.

This Whole Sea configuration would reduce the amount of Exposed Playa in the Sea Bed. The water surface elevation would be at -230 feet msl under this configuration. Therefore, the amount of Exposed Playa would be limited to a relatively narrow strip of land along the shoreline.

### ***Import-Export Water from and to the Pacific Ocean***

The purpose and capacities of this configuration would be identical to those described under the Import-Export from and to the Gulf of California configuration. The following subsections describe the conveyance and treatment requirements for the Import-Export from and to the Pacific Ocean.

#### ***Conveyance Facilities***

As described above under the Import from the Pacific Ocean concept, numerous areas with environmental protections are located along the San Diego County shoreline of the Pacific Ocean. These environmental protections would limit or preclude construction and operations of inlet/outlet structures that divert 9,200 acre-feet/day (3 billion gallons/day) and discharge 7,700 acre-feet/day (2.5 billion gallons/day). At this time, extensive shoreline environmental protections have not been identified in the ocean near Camp Pendleton. Therefore, for the purposes of this PEIR, it is assumed that the location of the inlet and outlet structures under this configuration could be located near Camp Pendleton. However, future environmental studies may preclude use of this area for import-export facilities.

Conveyance facilities between the Whole Sea and Camp Pendleton could be located along several routes as described in previous studies. One route that was evaluated in a previous study would be located parallel to State Highway 78 (Salton Sea Authority et. al., 1997; Reclamation, 1998). Another route that was evaluated was parallel to State Highways 22 and 76. These routes would range from about 100 to 130 miles in length and would need to raise the water elevation to 3,500 feet msl. Tunnels would be used along a large portion of the route to reduce the amount of pumping. Pipelines would be used in areas with pressurized flow. Canals could be used in areas with gravity flow. However, the gravity flow would exist in western San Diego County where land uses are limited due to existing communities or environmental protections.

Facilities to be constructed in San Diego County would need to comply with the county habitat conservation programs. The route that parallels State Highway 76 would cross several areas owned by various Indian tribes and would require approvals from those nations. Both routes would cross the Cleveland National Forest and require federal permits.

Power would be required for the pumping facilities. However, some electrical power needs could be recovered by hydropower generators located along the conveyance channels.

Inlet and outlet structures would need to be separated by a significant distance to prevent export water from being recycled into the inlet structures. These structures would need to be constructed and operated in accordance with the requirements of DFG, California Coastal Commission, possibly State Lands Commission, federal government, and possibly other agencies, if the facilities were located in Camp Pendleton or the intake and outlet operations affected the shoreline lands in Camp Pendleton.

Inlets would be constructed with fish protection structures to avoid entraining and entrapping fish and other organisms. Inlet structures of over a mile in length probably would be required. Outlet structures would be constructed with diffusers to provide adequate dilution and mixing. These structures would also be over a mile in length.

Recently, several proposals have been initiated for desalination facilities along the Southern California coastline. Environmental protections being considered for these facilities are assumed to be required for this configuration. However, the desalination facilities being considered are only 1 to 2 percent of the size of the facilities in this configuration. Therefore, it is not known what the environmental requirements or limitations would be for this type of facility.

### ***Treatment Facilities***

Water treatment facilities would be required for both import and export flows to avoid introduction of species into either the Pacific Ocean or the Salton Sea. The purpose of the treatment facilities would be to remove organisms and nutrients from the water without changing the salinity. Secondary wastewater treatment facilities could be used to achieve these water quality goals. However, to meet the discharge requirements, advanced treatment may be required to protect beneficial uses along the San Diego County shoreline.

The water treatment facilities could be located near the Sea or in San Diego County near the Pacific Ocean. The capacity of the treatment facilities would be 9,200 acre-feet/day (3 billion gallons/day) for the import water and 7,700 acre-feet/day (2.5 billion gallons/day) for the export water. Additional facilities would be required for disposal of the materials and organisms removed from the water.

### ***Habitat Benefits of the Whole Sea***

Salinity in the Whole Sea under this configuration would be similar to Existing Conditions because the stabilized salinity would be 40,000 mg/L. There would be estuarine conditions near the confluences of the New, Alamo, and Whitewater rivers.

Under Existing Conditions, desert pupfish can move between the drains and creeks in the Salton Sea. Under the Whole Sea configurations, this type of desert pupfish connectivity would continue.

The inlet and outlet structures would be designed to minimize or eliminate adverse impacts to the environment in the Pacific Ocean. The conveyance facilities also would be designed with appropriate mitigation measures, such as restoration of mitigation lands, to minimize or eliminate adverse impacts to the environment.

### ***Air Quality Management***

Construction activities along the conveyance corridor would require air quality management mitigation measures to reduce dust and emissions from vehicles. However, it is anticipated that these impacts could not be fully mitigated with existing or foreseeable technology.

This Whole Sea configuration would reduce the amount of Exposed Playa in the Sea Bed. The water surface elevation would be at -230 feet msl under this configuration. Therefore, the amount of Exposed Playa would be limited to a relatively narrow strip of land along the shoreline.

### **Partial Sea Configurations with Brine Sink within the Sea Bed**

The purposes of the Partial Sea configurations are to maintain a stable water surface elevation at -230 feet msl and a stable salinity of 30,000 to 40,000 mg/L. The Partial Sea configurations would include at least a Partial Sea, Brine Sink in the Sea Bed for disposal of saltwater, Air Quality Management components to provide dust control on Exposed Playa, and Sedimentation/Distribution Basins to remove silt from the inflows prior to diversion of the water into conveyance facilities. Considerations for each of these components are briefly described below. Additional information is provided in Appendix H-6.

#### ***Partial Sea Component***

The Partial Sea would be formed by a Barrier or Perimeter Dikes. A Barrier is a dam that impounds water, usually with depths of greater than 10 feet at the toe of the Barrier. A Perimeter Dike is a structure that impounds water, usually with water depths of 6 to 10 feet at the toe of the Perimeter Dike.

The majority of inflows would be conveyed into the Partial Sea in a canal-type structure. Saltwater would be removed from the Partial Sea through an outlet or spillway for conveyance to the Brine Sink. To maintain a stable elevation of -230 feet msl and a stable salinity of 30,000 to 40,000 mg/L, the flow into the Partial Sea must be monitored and maintained to replace the water lost to evaporation and diverted to the Brine Sink. The Partial Sea would be designed for an inflow pattern that would be consistent with seasonal changes in evaporation and saltwater management. During storms or when high seasonal agricultural flows occur, the additional inflows would be diverted into the Brine Sink to avoid reducing salinity in the Partial Sea below 30,000 mg/L.

#### ***Brine Sink Component***

The Brine Sink would be located at the lowest elevation in the Sea Bed that would not be covered by the Partial Sea. Water would flow by gravity from the Partial Sea to the Brine Sink.

The Brine Sink also would receive flows from the New, Alamo, and/or Whitewater rivers and San Felipe and/or Salt creeks that would be in excess of the flows required to maintain the stable surface water elevation and salinity of the Partial Sea, as described above.

#### ***Air Quality Management Component***

The Partial Sea configurations would include Exposed Playa in the Sea Bed that would not be covered by the Partial Sea, Brine Sink, or other facilities. The playa is currently under water and it is not possible to determine if the soils or the salts in the soils would be emissive as the water recedes. During the preparation of the PEIR, a range of methods for dust control on Exposed Playa were considered, as described in Appendix H-3. Extensive pilot studies would need to be completed as the water recedes to identify a range of methods appropriate for the local soil conditions. One of the methods for dust control in portions of Exposed Playa would use a portion of the inflows to irrigate water efficient vegetation. Use of water for Air Quality Management in this manner would reduce the available water for the Partial Sea. Therefore, the size of the Partial Sea would be reduced in relation to the areas with water efficient vegetation. Although it is not known if use of water efficient vegetation would be appropriate for dust control on the Exposed Playa, this represents a conservative approach for the purposes of the PEIR.

The Air Quality Management component would include Air Quality Management Canals to convey water to all areas of Exposed Playa, filtration systems with pumping plants, and buried drip irrigation facilities

to provide water to the water efficient vegetation. The Air Quality Management Canals would convey brackish water with salinity less than 8,000 mg/L.

### ***Sedimentation/Distribution Basin Component***

The New and Alamo rivers currently contain high concentrations of silt. Recently, the CRBRWQCB adopted Sedimentation/Siltation Total Maximum Daily Loads (TMDL) for these rivers. It is assumed that these requirements would be implemented within the study period. However, there would still be silt in the inflows.

The Whitewater River also contains high concentrations of silt due to storm events in the upper watershed. However, the CRBRWQCB has not initiated development of a TMDL for silt on this river.

Silt in the inflow could be removed in the Air Quality Management Canals or canals that convey water to the Partial Sea. However, to reduce maintenance efforts and the size of the conveyance facilities, Sedimentation/Distribution Basins would be constructed where the rivers meet the Sea Bed. The Sedimentation/Distribution Basins also would serve as a diversion facility to divert water into conveyance facilities or Brine Sink.

### ***Balancing Water Demands in Partial Sea Configurations***

For the Partial Sea configurations, the primary objective was to maximize the size of the Partial Sea while providing adequate water supplies to Air Quality Management and additional habitat components, such as Saline Habitat Complex, if desired. To determine the size of the Partial Sea, water demands/losses of Air Quality Management, managed habitats, and Sedimentation/Distribution Basins were determined and water was reserved for these uses. If possible, water that was diverted and not lost by evaporation in the habitat components could be conveyed to the Partial Sea.

Based upon the remaining water supply, a water balance analysis was conducted for several Partial Sea configurations with a variety of water surface elevation and salinity goals. Then, a range of locations for a Barrier that extended from the east to west shorelines was evaluated to determine the ability to meet water surface elevation and salinity goals. Through meetings with the Salton Sea Advisory Committee, the public, and stakeholders, the goals of a Partial Sea configuration were confirmed to include the following objectives:

- Salinity of 30,000 to 40,000 mg/L to maintain marine sea water quality;
- Water surface elevation of -230 feet msl to maintain the shoreline as close as possible to Existing Conditions;
- Partial Sea water to be located near communities on the western and eastern shorelines, and managed wildlife and agricultural areas along the southern shoreline; and
- Ability to maintain these conditions over the long term with a high level of reliability.

These criteria were considered in the development the Partial Sea configurations in Step 4, and in the identification of the range of alternatives in Step 5.

It should be noted that these assumptions were made for the purposes of the PEIR to allow the decision makers to select an alternative that would provide an overall approach, as described in Chapter 1. During project-level analyses, salinity, elevation, or reliability factors would be developed based upon more specific information related to inflows and other assumptions.

### ***Locations of the Partial Sea***

Previous studies evaluated a range of Partial Sea configurations. The primary configurations evaluated in those studies were a North Sea and a South Sea with Brine Sinks in the Sea Bed (Salton Sea Authority et.

al., 1997; Reclamation, 2000). In 2004, the Salton Sea Authority identified a configuration that provided a large Partial Sea in the northern Sea Bed with extensions of the Partial Sea along the western and southern shorelines (Salton Sea Authority, 2004). Also in 2004, the Imperial Group identified a configuration that provided several narrow, concentric Partial Sea water bodies around the entire circumference of the Sea Bed.

Initially the following five Partial Sea configurations were identified:

- North Sea - formed by a Barrier constructed from the east to west shorelines as close to the mid-Sea position as possible with a Brine Sink located to the south of the Barrier;
- North Sea Combined - a North Sea formed by a Barrier from the east to west shorelines as close to the mid-Sea position as possible, a smaller water body formed by a Perimeter Dike along the western and southern shorelines to maximize the amount of shoreline with adjacent water, and a Brine Sink located to the south of the Barrier;
- South Sea - formed by a Barrier constructed from the east to west shorelines located south of the mid-Sea position with a Brine Sink located to the north of the Barrier;
- South Sea Combined - a South Sea formed by a Barrier from the east to west shorelines located south of the mid-Sea position, and a smaller water body formed by a Perimeter Dike along the western and northern shorelines to maximize the amount of shoreline with adjacent water, and a Brine Sink located to the north of the Barrier; and
- Concentric Rings - two concentric water bodies formed by Perimeter Dikes that would extend around the entire circumference of the shoreline to provide water adjacent to all land uses and a Brine Sink in the middle of the Sea Bed.

The Barrier and Perimeter Dike locations in these configurations were developed to provide a high reliability that the water surface elevation and salinity objectives would be achieved in at least 80 percent of the years in the 2018 to 2078 period with a conservative range of projected inflows under the No Action Alternative-Variability Conditions. The statistical analysis used to determine the design inflow criteria is described in Appendix H-2. Due to the high level of reliability, the Barrier locations would be located several miles from the mid-Sea location. Therefore, with respect to the North Sea and the South Sea configurations, water would not be adjacent to the majority of the communities along the western and eastern shorelines.

### ***Habitat Benefits of the Partial Sea***

The habitat benefits of the Partial Sea configurations would be located in the Partial Sea including the deep open water, shallow habitat along the shorelines, and brackish water near the New, Alamo, and Whitewater rivers confluences. The shoreline length would be less than for the current Salton Sea.

Pupfish connectivity between the drains and creeks would be modified from Existing Conditions. Water along the shoreline could provide the connectivity. However, water does not exist adjacent to all drains or creeks in each of the configurations. In areas without water adjacent to the shoreline, desert pupfish connectivity could be provided with a Pupfish Channel that connects several drains along the shoreline. In other areas, it may not be feasible to connect drains and creeks, and the desert pupfish population in these areas could become isolated.

### ***Treatment Facilities***

Initially, water treatment facilities were considered as part of the Partial Sea configurations. The treatment processes were primarily focused on selenium and nutrient removal. However, as the preparation of the PEIR progressed, information provided by the CRBRWQCB and others indicated that projected selenium

concentrations would not create a high ecorisk related to inflows if the water bodies in the Partial Sea configurations had a salinity of at least 20,000 mg/L, as described in Appendix F. Therefore, water treatment for selenium was eliminated from consideration for the Partial Sea configurations.

Water treatment for nutrient removal was also considered as part of these configurations. Projected nutrient concentrations due to implementation of TMDLs established by the CRBRWQCB were anticipated to reduce the need for water treatment in the Partial Sea configurations. However, to provide a range of alternatives in the PEIR, water treatment was included in one of the Partial Sea alternatives, as described in Chapter 3.

### **Saline Habitat Complex Configurations with Brine Sink within the Sea Bed**

The Saline Habitat Complex configuration was developed based on the Shallow Saline Habitat concept described under Step 3. The Saline Habitat Complex configuration would provide a mosaic of shallow and deep water habitats with islands and snags that would be similar to the habitat located near the confluences of the New, Alamo, and Whitewater rivers and the Salton Sea and shallow shoreline habitat. This type of habitat has been extremely productive for both fish and wildlife at the Salton Sea, as described in Appendix H-1.

The Saline Habitat Complex configuration would include at least the Saline Habitat Complex cells, Brine Sink in the Sea Bed, Air Quality Management components, and Sedimentation/Distribution Basins. Considerations for each of these components are briefly described below.

#### ***Saline Habitat Complex***

The Saline Habitat Complex could be located in areas that could provide relatively shallow water along the shorelines. Salinities would range from 20,000 to 200,000 mg/L to support a variety of fish and wildlife in the different cells.

The Saline Habitat Complex would be formed by Berms constructed along the contours with Sea Bed materials to provide water depths of 6 feet or less at the toe of the Berms. The Saline Habitat Complex would be divided into cells that each would be about 1,000 acres. Sea Bed material could be dredged within cells to form islands and deep holes to provide different habitats within each cell.

Salinity could vary between cells to provide a habitat mosaic, as described in Appendix H-1. Water surface elevations would be stable for each cell, but could vary between cells.

Under the Saline Habitat Complex configuration, inflows would be conveyed into the cells in canal-type structures or directly diverted from drains. Water from each cell could be diverted into other cells, a canal, or Brine Sink. The salinity of each cell would be managed by controlling flow rates into and out of the cell.

Two different methods were considered during the development of the configurations to maintain salinity of at least 20,000 mg/L. In one method, saltwater from the Brine Sink would be pumped using temporary facilities during the start-up period of some of the Saline Habitat Complex cells. This method was used with a configuration that provided a minimal amount of Saline Habitat Complex area to reduce infrastructure needs. Under this configuration, there would be 26,000 acres of open water and 12,000 acres of land used for berms and islands, with a total Saline Habitat Complex area of 38,000 acres.

In the second method, saltwater would be pumped from the Brine Sink on a long term basis and mixed with the inflows prior to diversion into the Saline Habitat Complex cells. The configuration that used this method would maximize the Saline Habitat Complex area based upon existing bathymetry. There would be 44,000 acres of open water and 21,000 acres of land used for berms and islands, with a total area of 65,000 acres.

### ***Brine Sink Component***

The Brine Sink component for the Saline Habitat Complex configurations would be the same as those described under the Partial Sea configurations.

### ***Air Quality Management Component***

Air Quality Management components for the Saline Habitat Complex configurations would be the same as those described under the Partial Sea configurations.

### ***Sedimentation/Distribution Basin Component***

Sedimentation/Distribution Basin components for the Saline Habitat Complex configurations would be the same as those described under the Partial Sea configurations.

### ***Habitat Benefits***

The habitat benefits of the Saline Habitat Complex would be similar to existing shallow saline habitat along the shorelines of the Salton Sea and the brackish water near the confluences with the New, Alamo, and Whitewater rivers. The amount of shallow saline habitat could be greater than under Partial Sea configurations.

### ***Treatment Facilities***

Considerations for water treatment components for the Saline Habitat Complex configurations would be the same as those described under the Partial Sea configurations.

### **Application of Screening Criteria to Range of Configurations**

Screening criteria were used to further define the configurations and identify the range of alternatives. The screening criteria were based on compliance with the definitions of reasonable range of alternatives and feasibility under CEQA and federal and State requirements for water quality, air quality, and endangered species protection.

Based on CEQA, this PEIR identified a reasonable range of alternatives to:

- Permit a reasoned choice;
- Include alternatives that would substantially lessen or avoid significant effects of an action; and
- Feasibly attain most of the basic objectives.

The CEQA Guidelines state that the following factors, among others, may be taken into account when addressing the “feasibility” of alternatives:

- Site suitability;
- Economic viability;
- Availability of infrastructure;
- General plan consistency;
- Regulatory limitations;
- Jurisdictional boundaries; and
- Ability to legally acquire, control, or have access to the site.

For the configurations considered in the PEIR, several of these factors were either applied during the development of the configurations or were not applicable. For example, the suitability of the site was considered in the identification of the components in each of the configurations to the level of detail possible in the initial phases of the study. Economic viability and availability of infrastructure were not considered at this time because the configurations are being considered to meet the objectives without

bias toward limitations of available funds for construction and operations and maintenance or limitations of existing infrastructure.

General plan consistency was considered indirectly by evaluating the potential for recreational or local economic development of the alternatives. However, the objectives emphasize restoration of habitat and air quality management associated with the restoration activities. This may not be consistent with all portions of the general plans.

Regulatory limitations related to water quality, air quality, and special status species were considered as part of the broad screening criteria used to further define the concepts and develop the configurations. These regulations continue to be applied to the configurations.

Consideration for jurisdictional boundaries and the ability to legally acquire, control, and have access to a site are generally assumed in the development of the configurations and the alternatives for lands currently inundated by the Salton Sea. Lands owned by the federal government are used as a repository for drainage from the Imperial and Coachella valleys and for fish and wildlife management (Sonny Bono Salton Sea National Wildlife Refuge). In addition, State lands are used for recreation (Salton Sea State Recreation Area). It is assumed that these lands would continue to be available for these uses under implementation of the ecosystem restoration plan. Inundated lands owned by individuals, Imperial Irrigation District, and Coachella Valley Water District also are assumed to be available for the purposes of the PEIR either directly, through purchase, or through trade of similar lands located in other areas. Use of lands owned by the Torres Martinez Tribe would require agreements between the United States and the tribe for changes in land use under the restoration actions. It is assumed for the purposes of the PEIR that these agreements could be obtained for the currently inundated lands based upon the participation of the Tribe in previous planning efforts (Salton Sea Authority, 2004). However, the feasibility of acquiring land or easements for construction and operations and maintenance of facilities would need to be considered in project-level analyses. If such agreements could not be obtained, facilities would need to be modified.

Construction and operations and maintenance of facilities located in Mexico would require extensive agreements between the United States and Mexico. Many of the previous studies have evaluated importing water from and exporting water to the Gulf of California in conjunction with establishment of an extension of the Gulf of California to either Laguna Salada or Mexicali, as described above. If such a connection was constructed with approvals from governments in Mexico, it may be possible to extend the facilities to provide water into the United States. However, there would remain an issue of reliability if those facilities were not maintained for the purpose of providing water to the Whole Sea.

### ***Incorporation of Comments from Stakeholders***

The configurations were presented to the Salton Sea Advisory Committee, public, and other stakeholders. Comments received from these groups were considered as part of the screening process. Comments were related to developing different alternatives with a range of components, inflows, water surface elevations, and salinities.

Based upon a recommendation from the Salton Sea Advisory Committee, a range of alternatives was used to represent many permutations for the purposes of selecting a general direction for future project-level analyses. For example, comparison of alternatives with the same water surface elevations and salinity objectives would provide a prioritization of benefits and impacts for selection of a type of facility configuration, such as Saline Habitat Complex cells. However, during project-level analyses, specific sizes, locations, and salinity objectives would be determined based upon more detailed analysis of inflows, bathymetry, water quality, geology, habitat, sediment quality, and land ownership.

During project-level analyses, the combination and location of components should be evaluated. For example, it may be desirable and advantageous depending upon the rate at which the water recedes to provide facilities to separate the Brine Sink into cells that could be managed with separate salinity

objectives. These modifications could be included in most or all of the alternatives considered in the PEIR and would not affect the prioritization of the benefits and impacts of the alternatives as arrayed in the PEIR.

There were many comments that suggested combining Saline Habitat Complex cells with the Partial Sea configuration to extend water along the shorelines and increase shallow water habitat. Saline Habitat Complex areas were incorporated into several of the alternatives with Partial Seas.

The results of the application of the criteria are presented in Table 2-3.

**Table 2-3**  
**Results of the Application of Screening Criteria to Range of Configurations**

Configuration	Comments	Screening Results
Whole Sea Configuration - Import-Export Water from and to the Gulf of California	This configuration may be feasible if a canal or shipping channel was extended from the Gulf of California to Laguna Salada or Mexicali under a separate effort. However, to construct either a canal or a combination of canals and pipelines in Mexico for the sole purpose of ecosystem restoration in the Salton Sea would require agreements with governments in Mexico for construction and operations and maintenance. Access to the facilities would not necessarily be guaranteed and if the facilities were owned and operated by federal, State, or local governments, the United States would need to negotiate agreements with the Mexican government. This configuration does not meet the CEQA requirement for feasibility of the need to legally be able to control or have access to the site.	Eliminated from further analysis in the PEIR
Whole Sea Configuration - Import-Export Water from and to the Pacific Ocean	<p>This configuration would require compliance with water quality and environmental protection regulations for intakes and outfalls along the Southern California coast. It is uncertain if agreements with federal, State, and local agencies could be negotiated for the required large facilities.</p> <p>Recently, several desalination proposals have been discussed for the California coastline. The proposed desalination facilities were only 1 to 2 percent of the size of the Import-Export from and to the Pacific Ocean. The responses from the regulatory agencies to the proposed desalination facilities were considered in determining the feasibility of this configuration. It appears to be feasible to construct and operate intakes and outfalls along the coastline, however, there are significant research and monitoring requirements related to water quality and environmental protections for the proposed desalination facilities.</p> <p>At this time, it does not appear to be feasible to develop a 9,200 acre-feet/day (3 billion gallon/day) intake and 7,700 acre-feet/day (2.5 billion gallon/day) outfall that would be permitted along the Southern California coastline without extensive monitoring programs during project-level analyses. This alternative also would require extensive agreements from federal, State, and local governments for the conveyance corridor between the Whole Sea and the Camp Pendleton.</p>	Eliminated from further analysis in the PEIR
Partial Sea Configuration - Concentric Rings	This configuration is considered to be feasible for further analysis. This configuration does not include any Saline Habitat Complex cells.	To be considered as an Alternative
Partial Sea Configuration - North Sea	This configuration is considered to be feasible for further analysis. Based on comments from the Salton Sea Advisory Committee and stakeholders, this configuration was modified to include Saline Habitat Complex along the western, southern, and eastern shoreline.	To be considered as an Alternative

**Table 2-3**  
**Results of the Application of Screening Criteria to Range of Configurations**

<b>Configuration</b>	<b>Comments</b>	<b>Screening Results</b>
Partial Sea Configuration - North Sea Combined	This configuration is considered to be feasible for further analysis. Based on comments from the Salton Sea Advisory Committee and stakeholders, this configuration was modified to include Saline Habitat Complex along the western, southern, and eastern shorelines.	To be considered as an Alternative
Partial Sea Configuration - South Sea	This configuration is considered to be feasible for further analysis. However, based on comments from the Salton Sea Advisory Committee and stakeholders, this configuration was not included in the Final Range of Alternatives because the benefits and impacts would be similar to those in the South Sea Combined configuration. If that configuration was selected as the preferred alternative, this concept could be evaluated in the project-level analyses.	Eliminated from further analysis in the PEIR
Partial Sea Configuration - South Sea Combined	This configuration is considered to be feasible for further analysis. Based on comments from the Salton Sea Advisory Committee and stakeholders, this configuration was modified to include Saline Habitat Complex along the western and eastern shoreline.	To be considered as an Alternative
Saline Habitat Complex Configurations	<p>This configuration is considered to be feasible for further analysis. Based on comments from the Salton Sea Advisory Committee and stakeholders, two Saline Habitat Complex configurations were identified for the final range of alternatives.</p> <p>One configuration would use temporary measures to mix saltwater from the Brine Sink and inflows in the initial Saline Habitat Complex cells. Then, water elevations and salinity would be managed by controlling flows into and out of the cells. This configuration would minimize the amount of Saline Habitat Complex cells to reduce infrastructure and would include 26,000 acres of open water and 12,000 acres of land.</p> <p>The second configuration would pump saltwater from the Brine Sink to mix with the inflows prior to diversion into the Saline Habitat Complex cells. This configuration would maximize the amount of Saline Habitat Complex cells that could be constructed in the Sea Bed and would include 44,000 acres of open water and 21,000 acres of land.</p>	To be considered as two Alternatives

## **Step 5: Development of the Final Range of Alternatives**

The results of the analysis of configurations were discussed with the Salton Sea Advisory Committee. After consideration of input from the public and stakeholders, the Salton Sea Advisory Committee recommended that the Whole Sea Configurations not be considered further.

During the analysis, the Salton Sea Advisory Committee also recommended that proposals developed concurrently by the Salton Sea Authority and the Imperial Group under separate programs be included in the alternatives considered in the PEIR. The proposal prepared by the Salton Sea Authority was similar to the Partial Sea -North Sea Combined configuration with different assumptions for the size and location of the Partial Sea, Air Quality Management, and several other components. The proposal prepared by the Imperial Group was similar to the Partial Sea - Concentric Rings configuration with different assumptions for construction techniques and locations for the Partial Sea, Air Quality Management, and several other components. These alternatives were added based upon information provided by these groups in February

and March 2006, as presented in Appendix I. The final range of alternatives is described in detail in Chapter 3 and Appendix H-7. The alternatives were listed in the following order to represent an increasing amount of complexity and number of components:

- Alternative 1 – Saline Habitat Complex I (does not include long term facilities to pump saltwater from the Brine Sink and does not maximize the amount of Saline Habitat Complex cells);
- Alternative 2 – Saline Habitat Complex II (includes long term facilities to pump saltwater from the Brine Sink and maximizes the amount of Saline Habitat Complex cells based upon bathymetry);
- Alternative 3 – Concentric Rings (includes two concentric water bodies, or rings, and no Saline Habitat Complex cells);
- Alternative 4 – Concentric Lakes (as defined by the Imperial Group);
- Alternative 5 – North Sea (includes Saline Habitat Complex cells);
- Alternative 6 – North Sea Combined (includes Saline Habitat Complex cells);
- Alternative 7 – Combined North and South Lakes (as defined by the Salton Sea Authority); and
- Alternative 8 – South Sea Combined (includes Saline Habitat Complex cells).